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AUTHOR Cooper, Catherine R.; And Others
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ABSTRACT

Experimental and supplementary observational studies of how children help one another learn are reported. In the experiment, developmental patterns in children's discourse in two common peer-learning situations were investigated. Sixty-four pairs of children, drawn equally from kindergarten and second grade, participated in the study. Dyads, composed of friendship pairs, were matched by age, sex, and grades. In the first situation, children were engaged in a cooperative learning activity game; in the second situation, members of the original pairs were asked to teach another child to play the game. Sessions were videotaped, and all verbal interaction was transcribed and coded. Elements of the code included (1) attention-focusing statements, (2) instrumental statements, (3) evaluative responses, (4) referential specificity, and (5) nonverbal behaviors. The supplementary observational study was conducted in a kindergarten classroom of a public school and in a second-grade classroom of a private parochial school in which children were encouraged to work together. The kindergarten class consisted of 16 girls and 11 boys; the second grade class included 12 girls and 10 boys. Audio recordings were made at children's tables as they worked, and supplemental field notes were made to describe nonverbal behaviors, seating arrangements, and other pertinent contextual information. Tapes were reviewed and indexed for the occurrence of instructional episodes among children. Results are discussed. (Author/RH)

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Children's Discourse in Cooperative and Didactic Interaction: Developmental Patterns in Effective Learning

Catherine R. Cooper

with Susan Ayers-Lopez & Angela Marquis

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Division of Child Development and Family Relationships

Department of Home Economics

The University of Texas at Austin

1980

Preface

This is a final report of a two-year research project funded by Contract No. NIE-6-78-0098 from the National Institute of Education for 1978-1980. The contribution of many individuals to this work is gratefully acknowledged: for their sustained colleagueship, to Susan Ayers-Lopez and Angela Marquis; for collection and/or analysis of data: Cynthia Aldridge, Tad Bailey, Victoria Carow; Susan Crabtree, Deborah Gamble, Mary LeBlanc, Lisa Loth, Stephanie Odell, Tammy Perkins and Allison Schockner; for secretarial assistance, Jane Poplawski; and for their participation and support, the children, parents, teachers, and principals of the four schools of the study.

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Children's Discourse in Cooperative and Didactic Interaction: Developmental Patterns in Effective Learning

This paper reports two investigations of how children help one another learn: one conducted in an experimental setting and the other in the classroom context. The studies are based on the view that peer interaction can be a context for intellectual development, and consequently that basic knowledge of the patterns of discourse that typify such exchanges between children is needed. The purpose of the experimental phase was to provide a systematic look at developmental patterns in children's discourse in two common peer learning situations: cooperative and didactic. In cooperative learning, children have an equal amount of information concerning a shared problem. In a didactic situation, one child has information the other needs to solve the problem. To supplement and extend the experimental work, observations of spontaneously occurring peer-assisted learning were made in relatively open classrooms where the negotiation of collaborative relationships among children could be observed.

This research is developed from a view of the importance of peer interaction in learning that has been emerging in theoretical and educational domains in recent years. As seen by social learning theorests, the peer group provides a source of models for observational learning (Bandura, 1972). Piaget has stressed that peer interaction is a context for the moderately novel stimulation that reduces egocentrism and enhances intellectual growth (Piaget, 1959). Given the central place it is accorded in theories of cognitive development and increasing reliance on the peer group as a setting for learning in open classrooms and peer

tutoring programs (Allen, 1977; Sharan, 1980; Slavin, 1980), the specification of the characteristics of peer collaboration is vital.

In this project, a key emphasis was not only the description of peer interaction but also demonstrating the effects of discourse process on what children learn, i.e., on establishing a criterion of cognitive effectiveness for peer discourse. Studies of peer tutoring have demonstrated success (e.g., Allen, 1977) but have not revealed how the effective tutors teach. Most programs have taught the tutors to emulate adult teaching ideals: to focus the tutee on the task, use explicit descriptions, and give prompt and positive feedback. Actual tutoring discourse has not been examined, nor have developmental patterns in the capabilities of tutors or in the needs of tutees been systematically addressed, perhaps because most formal "peer" tutoring programs have involved fifth or sixth grade children helping kindergarten, first, and second grade children. Similarly, cognitive gains on Piagetian conservation tasks by primary grade children after peer interaction experience have been reported (Murray, 1972). Once again, developmental patterns of children's discourse associated with effectiveness have not been systematically investigated in these situations.

Recently, an increasing amount of research activity has focused on children's dyadic communication behavior, emphasizing two common themes. The first concerns the demonstration of children's assets as communicators, as opposed to the egocentric liabilities emphasized in Piaget's influential descriptions of young children's speech. Current work has produced accounts of the individual linguistic devices children use to attract and maintain the attention of their listeners (Mueller et al., 1977); to

direct the behavior of others (Ervin-Tripp, 1977); to teach (Cook-Gumperz, 1977); and to persuade (Clark & Delia, 1976). A second theme has been a general shift away from syntax towards an emphasis on the functions and social uses of language (Kernan-Mitchell & Ervin-Tripp, 1977). This positive and pragmatic orientation provides the framework for a closer study of children's learning among peers.

In the present study, the discourse of peer learning examined in terms of instructional episodes, which are initiated by a bid either from the teaching or the information-seeking partner. Such an approach is based on investigations of sequences of teacher-learner discourse in learning contexts (e.g., Bellack, Kleibard, Hyman, & Smith, 1966; Green & Wallat, in press; Sinclair & Coulthard, 1975). These sequences can be considered as series of strategic moves in an interactional game in which the one person structures, solicits, and reacts to the response of the other. Cooper (1980) utilized such a framework to describe the exchanges between pairs of preschool children in cooperative learning episodes. Communication within a dyad was analyzed for orienting the partner and managing his or her behavior, first to understand the task and subsequently to maintain attention to it; instrumental statements, including questions, directives, and other descriptive comments pertaining to the task; responses to directives and question; and evaluative feedback, including praise, criticism, or comments about progress towards task solution. The referential specificity of instrumental statements was also examined. Cooper found that distinctive use of each of these speech patterns was associated with patterns of effectiveness in peer learning situations and with revealing developmental patterns as well. This framework will form the basis for the analysis of discourse in the present

study.

The current study combines goals emerging from issues in both developmental psychology and sociolinguistics. Work in developmental psychology has examined age changes in communication as a function of the cognitive needs of the speaker and listener, for example, the reliance by younger children on concrete materials as a focus for conversation and a greater need by younger children for attention-focusing support (Mueller et al., 1977). Most developmental work has not specified the relationship of individual differences in communication behavior to cognitive outcomes. Sociolinguistic approaches have been concerned with the influence of the social context, including role relationships between participants, on language behavior (Hymes, 1974). However, in recent work children have been asked by adults to assume teaching roles (Allen, 1976; Cazden, 1979); hence the spontaneous enactment of these roles in the classroom has not yet been examined.

To answer both kinds of questions, a methodological approach that incorporates both experimental and naturalistic components is required. The experimental situation has the advantages of comparability across the individuals and age groups of the children observed and across the content of the interactions. The situation also eliminates many distractions, so that children could be observed as they managed a restricted set of communication tasks involved in collaborating with or instructing a peer. The experimental situation also provides the opportunity to observe children who have difficulty with these communication tasks, whereas such children may never be observed spontaneously instructing their peers in the classroom. However, to specify the relationship between the social

context and peer learning, observations must be made in an open classroom, where a child who seeks either to teach or to learn from another child must first select a child to play that role, negotiate a relationship with that child, and sustain not only his or her own attention to the task but also that of the partner.

In summary, the speech events under investigation are those of cooperative learning and teaching; the aspects of discourse examined include attention focusing, questioning, directing, commenting, responding, and evaluation; and the variables of concern are those of task orientation (cooperative and didactic); age (kindergarten and second grade); sex; and for some observations, physical setting (focused experimental task and classroom). The study examines discourse sequences in a manner that will both yield developmental data in the early school years and specify the role of patterns of discourse styles on children's learning.

I: The Experimental Observations

The experimental study was designed to provide a view of children's discourse skills under conditions of minimal distraction, and when the roles of cooperating partner, teacher, and learner did not have to be negotiated. As Vandell and Mueller (1977) have found with younger children, it could be anticipated that interaction in focused dyadic exchanges might be more developmentally advanced than social behavior in a group situation.

Method

Subjects. Sixty-four pairs of children participated in the experimental study with equal numbers from kindergarten and second grade, and an even distribution between boys and girls. Dyads were matched by age,

sex, and grade and were composed of friendship pairs, with the expectation that the most sustained and elborated sequences of interaction would be inhibited in such dyads. The children were from working- and middle-class families, and were attending public schools.

Procedures and Apparatus. Children participated in two brief (approximately 15-minute) sessions over a two- or three-day period. In one session children were engaged in the cooperative learning activity; in the other session, members of the original pairs were each asked to teach another child who was unfamiliar with the game how to play it. The sessions took place in a vacant but familiar room at the children's school.

The game involved a pan balance scale and a set of hollow plastic blocks which varied in weight but not in size. The blocks contained small lead weights and had simple line drawings affixed to each face. Each child was given a set of six blocks with six different weights and three designs (man, house, flower). Thus two pairs of blocks in each child's set had the same design, so children could not solve the problem simply by matching pictures, although such a strategy would improve their efficiency. The children had identical sets of blocks and worked together to find pairs of blocks which, when placed on the scale, caused a rod to point to a clown's face at the base of the scale. In this way, the children were mutually involved in the achievement of the task solution and had an explicit criterion for success. (See Appendix A)

Response measures and coding. Videotape recording equipment was used to record the two sessions. All verbal interaction was transcribed from the videotapes and utterances were numbered consecutively so the sequentiality of the interaction was preserved. Coders, unacquainted with the

hypotheses of the study, coded simultaneously from both videotapes and transcripts. Elements of the code included:

1. Attention-focusing statements - alerting or orienting the parnter to the task, such as "hey", "look", and the partner's name;

2. Instrumental statments, including:

a. directives or request for action, either direct, - "put the heavy one on now", or indirect - "we're supposed to do the heavy ones";

b. questions or requests for information, "tell me which one you're going to try", "where's my big one?";

c. comment relevant to the task - "this is heavy";

d. comment irrelevant to the task - "oh-oh spaghettio";

3. Evaluative responses, including:

a. Praise - "you put the right one in";

b. Criticism - "you dummy - you did it wrong";

c. Task evaluative comments, relating to the procedures or subject matter rather than to persons - "the pointer's pointing to the clown";

4. Referential specificity:

a. Specific - "the flower one", "the heavy one";

b. Nonspecific - "that one";

5. Nonverbal behaviors:

a. pointing

b. showing, gesturing with materials while looking and speaking to the partner.

Reliability of coding for behaviors within each category was established at above .80 and monitored throughout coding. The videotapes were also

coded directly for two dependent variables which measured performance on the task: the number of successfuily matched pairs of blocks, six being the maximum; and the total number of pairs placed on the scales (the number of attempts). For these measures, the dyad, not individual children, constituted the unit of analysis.

Results and Discussion

The mean frequencies of communication behaviors for each age group and situation are given in Table 1. Three-way analyses of variance were conducted on each of

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Insert Table 1 about here

---

the communication behaviors and outcome measures as a function of age (kindergarten, second grade), sex, and situation (cooperative, didactic). On outcome measures, no main effects were observed; for communication behaviors, analyses revealed several age and condition effects, but neither sex effects nor interactions.

Children's communication styles varied strikingly in the two situations. Compared to those in the cooperative task, children in the teaching situation expressed more directives, $F(1,56) = 16.97$, $p < .05$; and made fewer evaluative comments on their progress on the task, $F(1,56) = 10.02$, $p < .01$. Children in the teaching situation more frequently pointed to their materials, $F(1,56) = 15.63$, $p < .01$; and showed their partners what to do with their materials by combining verbal and nonverbal modalities, $F(1,56) = 4.50$, $p < .05$.

These findings indicate a distinctive style of communication in the roles involved in cooperative and didactic interaction. In the more

Table 1

Mean Number of Communication Behaviors by Dyads in Cooperative and Didactic Situations: Significant Main Effects

	Age		Condition	
	K	2	Cooperative	Didactic
Attention focusing	5.78	5.90	4.94	6.75
Questions	3.25*	2.06	1.84*	3.47
Directives	13.47*	8.75	7.59*	14.63
Descriptions	11.59	9.34	9.78	11.16
Accurate labels	3.66*	1.66	3.41	1.91
Nonspecific labels	6.44	4.43	4.78	6.09
Praises	.56	.28	.25	.59
Criticizes	1.13*	.13	.75	.53
Evaluative comments	13.78	15.81	18.68	10.91
Points	5.97	5.25	3.56	7.66
Shows own	5.88*	3.03	3.44	5.47
Shows other	2.00	1.25	1.00*	2.25

* Difference in means is significant at $p < .05$ or greater. $Df = 1,56$

asymmetrical relationship of teacher and learner, a greater focus on the management and coordination of behavior was apparent, with children using both instrumental language of questioning and directing and also nonverbal gestures of pointing and showing their partners appropriate actions to emulate. In the cooperative setting, children were less focused on directing one another's actions, and more concerned with the effectiveness of their efforts in finding matching pairs. It is pertinent to emphasize how numerous were the occasions in which children expressed evaluative comments such as "the pointer is pointing to the clown's face" (indicating matching pair of blocks had been located) in contrast to the very low frequency of praising or critical remarks directed at the partner.

Age differences in communication behaviors were also numerous. Compared to second graders, kindergarten children expressed more directives, $F(1,56) = 3.90$, $p < .05$; and criticism, $F(1,56) = 8.47$, $p < .01$. The younger children also more frequently showed their materials and actions to their partners, $F(1,56) = 6.92$, $p < .01$. The developmental differences indicated that the younger children engaged in more extensive interaction than older pairs, especially in the instrumentally engaged forms such as questioning, directing, and labeling the materials, as well as in showing materials to the partner. It appears that the younger children required a higher density of such exchanges in order to accomplish the same progress as older dyads.

To examine the relationship between communication behavior and effectiveness on the task, chi-square analyses were conducted to determine the predictors of success on individual episodes. For this analysis, the transcripts of each session were segmented by considering each time a dyad chose blocks to try and then placed them on the scale as one trial, so

that the contingency between the use of each communication behavior and effectiveness could be assessed for each attempt. A chi-square analysis was performed on effectiveness (success vs. failure on the trial) for each communication behavior variable (presence vs. absence) for each task and age group. Note that this analysis assesses the role of the presence or absence of a behavior, not of its frequency. The results of the analysis are given in Table 2.

Insert Table 2 about here

The analyses indicate that for the cooperative task, effectiveness was achieved when children communicated by pointing (including picking up and displaying blocks), showing their blocks to their partner, using directives, providing specific labels for the blocks, and making evaluative comments. Younger children were successful when they showed their partner which blocks to try with their own materials and when asking questions. The effective use of these communication patterns is exemplified by the following pair of kindergarten boys:

Why don't you try your heavy one? (shows block to partner) Why don't you try putting your heavy one?	O.K. House? (shows block to partner.) I'll put gingerbread.
* * * * * * * * *	
Heavy one?	Heavy one.
O.K.	It's pointing! (Blocks balance.)

Table 2

Chi-Square Assessment of the Relation Between Success on Individual Trials and Presence of Specific Communication Behaviors

Communication Behavior	Cooperative Task		Didactic Task	
	Kindergarten	2nd grade	Kindergarten	2nd grade
Attention focusing	.55	2.14	.34	1.06
Questions	6.79**	2.30	3.28	.58
Directives	5.59**	12.04**	.49	1.34
Relevant comments	.27	.63	.17	5.67*
Labels blocks	12.66**	7.97**	6.95*	6.62*
Evaluative comments	23.95**	4.14*	11.61**	3.73
Pointing	7.87**	6.22*	2.76	3.57
Showing own blocks	7.73**	4.46*	.11	4.20
Showing other's blocks . . .	9.18**	[a]	10.40**	1.02

[a] Insufficient frequency for analysis.

* $p < .05$ (≥ 3.84).

** $p < .01$ (≥ 6.64).

On the didactic task, younger children were effective when they indicated with the partner's materials which blocks to try when using accurate labels, and making evaluative comments. Older children were effective when they displayed their own materials to their partners, made descriptive comments relevant to the task, and made evaluative comments. Some children achieved successful attempts using only the nonverbal behaviors of pointing to the blocks they thought should be used. In such cases, the gesture operated as a directive, with the partner looking at the high-lighted block, then finding one that matched it, either by matching the picture or the weight. The showing of blocks to the partner was done primarily with the speaker's own materials, and was sufficient to improve the chance of success in both tasks, with the exception of younger children in the didactic situation.

A notable contrast between the two situations concerned the effectiveness of directives in cooperative efforts and the absence of such an effect in the didactic situation, in which such guidance might have been expected to be helpful. Perhaps in the cooperative task, in which children shared power more equally and thus both could plausibly give directives, both children could also be more responsive to them. Many of the descriptive comments, which were associated with effectiveness, made by older children in the didactic task could in fact be interpreted as subtle or polite forms of directives, such as "Now I'm going to try my gingerbread one."

Finally, whatever the degree of indirectness of the request for action, providing specific descriptions of the blocks was characteristic of successful efforts, e.g., "get your heavy house" rather than "now try

another one", as was the use of evaluative comments. Both of these communicative behaviors reflects a precision of focus and continued attending to details of the task.

The experimental study has yielded a differentiated picture of the role of a set of communication behaviors and communicative competence. Which behaviors contribute to effectiveness varies to some extent with age and context, but these findings demonstrate how differences in communicative style can have substantial consequences to children's learning.

II. The Classroom Observations

The classroom environment was observed to answer a different question: how children spontaneously interact as they help one another learn. What roles do children assume, and how are they enacted? In conventional teach-child interactions, the asymmetries of status, knowledge, and power are readily apparent; current analyses of teacher-child discourse reflect the responsibilities of teachers to maintain social order in the classroom by elicitation of behavior from students, allocation of turns, and regulation of access to the teacher's time and attention (Eder, 1979; Mehan, 1979; Merritt, 1979). In peer realtionships, the relative ambiguity of status makes the often explicit negotiation of dominance hierarchies an important function of interaction. How are the asymmetrical roles of teacher and learner negotiated? Current developmental sociolinguistic work in classrooms (e.g., Genishi 1979; Cherry-Wilkinson, 1978; Steinverg & Cazden, 1979) suggests that the differential status of children seeking or offering information in the classroom would require modification of speaking styles to achieve their learning goals, and that depending on the social status of the child, the learning outcome may vary significantly (Garnica, in press). Although some current work has focused on peer learning that is initiated by an adult request (e.g., Allen, 1978; Cazden, 1979) in the form of "instructional chains", we still need to know about spontaneous peer learning, both by children in the teaching role and in the learner role.

The second basic issue of this aspect of our study concerned developmental changes in spontaneous learning excnanges. During the early school years, for example, we have clear evidence of qualitative and quantitative

changes in how children manage their attentional resources, categorize and sort their experiences in physical and social domains, and consider and reflect upon not only their own thoughts but the thoughts of others (Flavell, 1977). Relating such developmental themes to classroom communication is essential to understanding how individual children may best be served in the classroom. Unfortunately, very little developmental data exist in this area (Genishi, 1979; Schacter, 1974).

Our third question involved identifying characteristics of effective spontaneous peer learning discourse among kindergarten and second grade children. These issues were examined in terms of the same framework derived from research in speech or conversational act analysis (e.g., Dore, 1977; Searle, 1971) as used in the experimental situation, in which information exchange transpires when a speaker first focuses the attention of a listener, then provides an instrumental statement, such as a question, command, or pertinent descriptive comment. The listener has an opportunity to respond, and the exchange may then be evalusted. Examining these speech events and the outcome of the children's conversations allows us to assess the degree to which such factors as general attentional support and referential specificity are necessary for effective communicative exchanges between younger learners.

To answer these questions, we have used both emic and etic approaches. By treating the questions of the forms of peer learning from an emic perspective, open to unanticipated patterns in the data, we have been able to appreciate the variety of peer learning forms. and by adapting a more etic, predetermined framework, the sequence of speaker elicitation-listener response-speaker evaluation used by many students of classroom discourse

(e.g., Bellack, 1966; Cook-Gumperz, 1977; Mehan, 1979; Sinclair & Coulthard, 1975), we could discern patterns across individual learning episodes and trace both developmental differences in the early shcool years and the effectiveness of different discourse patterns in achieving the goals of teaching and learning within the peer network.

Method

Subjects and Setting

Observations were conducted in a kindergarten classroom of a public school and a second grade classroom of a private parochial school. The kindergarten class consisted of 27 children, 16 girls and 11 boys, and the second grade class included 22 children, 12 girls and 10 boys. Both groups of children came from working-and middle-class families. Our selection of a parochial school was made after several unrewarding attempts to find a school in the public system which housed a genuinely open classroom. Several schools had been recommended within the system, when in fact their openness referred merely to architectural features of the building (absence of walls dividing classes of the same grade level) while children were expected to follow traditional "don't-talk-to-your-neighbor" rules of peer interaction. Thus it was with a great deal of relief that we finally located the classroom in the parochial school in which peer interaction was indeed "legal" and consistently encouraged as a way for children to master classroom learning activities.

A further distinction must be made, however, between a classroom in which children learn primarily by working collaboratively with peers on group learning projects, and a classroom in which children are allowed

and encouraged to work together, helping and seeking help from one another on activities in which outcomes are primarily in the form of individual achievements, including workbocks, stories, spelling sheets, or cirsive exercises. The second grade classroom in which we observed was of the latter sort.

The data from these rooms were collected by research assistants, one of whom joined each classroom as a participant observer, helping the teachers and their aides by answering the children's questions, distributing materials and helping supervise some classroom activities, but was mostly free to move around the classroom to observe. They chatted with the children but did not cultivate the role of teacher, so the children would not rely on them for help when they could assist one another. The children were introduced to the research assistant as someone who would be helping in the room and who also would be using a tape recorder because "she was interested in how they did their school work."

The physical organization of the kindergarten classroom was distinguished by 8 different learning areas; math, reading, art, dramatic play, science, instructional records, and 2 book areas, with tables or floor space set aside for each area. Children worked at large working tables rather than desks. Children would move from area to area, depending upon how rapidly they completed their project, usually math or art, and children could then instruct or help others as both were engaged in the project.

The physical organization of the second grade classroom was distinguished by the presence of five working tables, science and math

learning areas, and only two pairs of student desks. The children spent much of their day working at the group tables on individual assignments while the teacher or aide worked with individuals or small groups.

Procedures

For both age groups, the sampling of children's instructional episodes was as systematic as possible, given the variability of the amount of time children associated in groups. The research assistants identified periods when children were working at their tables on class assignments by observing daily activities for a week. During the subsequent weeks each observer placed a small audio recorder on the children's tables as they worked, encouraging them to continue with whatever they were doing. Children who were sitting alone or talking with the teacher or aide, were not recorded.

Recordings were made on a continuing basis through the weeks of April, 1980 for the kindergarten class, and during late April and May, 1979 for the second grade class. Supplemental field notes described nonverbal behaviors, seating arrangements, and other pertinent contextual information. The tapes were reviewed and indexed for the occurence of instructional episodes (similar to the instructional sequence units of Green and Wallat, 1979). Seven episode types became apparent as we examined them. They occurred when children either 1) asked for the help of a peer (learner bid); 2) spontaneously offered help (teacher bid); 3) referred only to the rate of work or attending of others without teaching (pacing); 4) made evaluative statements (evaluative); 5) attempted to join a learning group (joining); 6) attempted to manage others behavior; or 7) participated in cooperative

learning by taking turns or pursuing a common goal (collaborative).

The episodes were analyzed in the following sequence. Research assistants first checked the transcripts of the conversations, marking where topics of conversation began and ended. Each episode which contained no explicit teaching or learning bids was coded into pacing, joining, behavior management, and evaluation categories. If the exchange involved speech events such as questions or directives (with or without one or more of the preceding functions) then the episode was classified as a teaching situation, and categorized as a teacher bid, learner bid, or collaborative episode. The distinction between the teaching and learning bids depended upon the first move in the conversation. If its function was to request aid, information, or materials from another child, it was considered learner-iniated. If the first move involved requesting action, offering help, or giving information to another, it was considered a teaching bid. Collaborative episodes were distinguished by descriptive comments or by alternating moves, such that both children were making teaching and learning statements. Inter-rater reliability of coding for each item was established at above .80 and monitored throughout coding.

Results

The earliest analyses concerned the patterns of contact among the children. The records of the seating arrangements of the children in the room provided an indication as to which other children each child would have as potential learning partners. For the kindergarteners, few stable learning groups occured. Although some children regularly

worked in pairs, most approached many other children during the observation periods. A small number of children remained in observer or isolate roles. In contrast, the second grade class contained more stable learning groups, as well as others who worked in close proximity to other children but did not seem to exercise deliberate choosing of "neighbors", while others remained quite isolated from any peer association as indicated by their being observed with almost no other children on these occasions (see Figure 1). These observations illustrate a developmental phenomenon with implications for school learning: young children tend to have more ready access to others in their class, but by the second grade this access is limited, with most peer learning occurring within a network of close friendship relationships (Corsaro, 1979; Rubin, 1980).

Functions of the Instructional Episodes

The remaining analyses involved the coding of the instructional episodes. The entire code is summarized in Table 3, and the frequency and percentages of each episode type by age is given in Table 4. Distributions of these forms of peer learning indicate that younger children engaged in a greater proportion of teaching bids, attention-managing, and self-evaluation (which was primarily self-praise), and that older children exceeded younger ones in the frequency of collaborative interactions, while the numbers of learning bids, joining, and pacing were similarly distributed in the two groups.

Our experience in coding these episodes suggests that these functions could be viewed as a continuum of activities, beginning with a child's awareness of his or her own state of understanding (Markman, 1978).

FIGURE 1

Frequency of Association of Pairs of Children During Peer Learning Activities in a Second Grade Classroom

Child	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
A...						3		2			1							1				1
B...				4[a]			1			3	1		2			1[b]						
C...				1	4[a]		1						2			1		1				
D...							i				3					1						
E...							1		1	3		2	5[a]		3	1		1		1[c]		
F...								5[a]					1		1	1		2				2
G...																1					1	
H...														1	5[a]			3	1		1	3
I...												1		1			4[a]	1	2	1		
J...												2	3					1			1	
K...											1	1				2					1	
L...													1							1	2	
M...																1		1				
N...															1		2		3		1	
O...																1		2	2		1	2
P...																						
Q...																		1	2			
R...																						2
S...																					1	
T...																						
U...																						
V...																						

Note.-Seven occasions were sampled.

a. Examples of stable groups.

b. A child with relatively unstable friendship patterns.

c. An isolated child.

Table 3

Overview of Peer Learning Interaction Code for Classroom Observations

I. Learning Episode Functions:

A. Teacher bid - child spontaneously offers information, "Did you know that lions sleep in the daytime?";

B. Learner bid - child seeks information from another child, "How do you do this?";

C. Pacing - child refers only to the rate of work or attending of others without providing subsequent teaching or elaboration on the same topic, "Hurry up, you guys";

D. Management - child attempts to control general behavior of others, "Stop it";

E. Self-evaluation - child makes either positive or negative statement about self, "What a good fish", "I'm having trouble";

F. Joining - child attempts to join another child in learning activity, "Can I sit here?";

G. Collaboration - child participates in either an explicitly cooperative task structure or an alternation of teacher and learner roles within an activity, "O.K., you read one page and I'll read one page".

II. Utterance Functions (coded for teacher and learner bid episodes).

A. Attention focusing - alerting or orienting another child to the learning task, ("hey", "look", and saying the child's name);

B. Moves, including:

1. Directives or requests for action; either direct, ("Put a G here", or indirect, "Why don't you do the ones on page 8?");

2. Questions or requests for information, "What is the capital of Rhode Island", "Tell me the answer to number 4";

3. Request for help, rather than specific information, "Could you help me?";

4. Relevant comments - descriptions that are not coded as other moves or responses, "This sure is a long story";

5. Irrelevant comments - playful use of language, or other off-task comments, "Nanu nanu shazbat";

C. Responses or Consequences of moves.

1. Informative responses (+) - complete answer to a question or directive, including agreement or appropriate nonverbal response;

2. Uninformative Response (-) - an incomplete or nonspecific answer;

3. Acknowledgements (+) - response indicating listener is attending without providing substantive information, "Bill?", "Yes";

4. Responses as question or directive (0) - "Where's my spelling?", "Why are you doing that one?" These are recorded as moves;

5. Arguments or corrections (0) - a counterassertion providing information discrepant from that just given may follow a relevant comment by learner or teacher, "It's time for art", "We don't have to go today";

6. No response (-) - includes no verbal response, irrelevant response, explicit rejection of the role solicited, "I sure need help on this", "Who cares?";

D. Evaluative Statements

1. Praising another child - "You put the right one in";

2. Criticizing another child - "You're a dum-dum";

3. Praising self - "I'm the greatest";

4. Criticizing self - "I blew it";

5. Task evaluative comments - relating to the procedures or subject matter rather than to other children, "This puzzle is cinchy", "I like the Z's the best";

III. Referential specificity (coded for directives and questions)

A. Specific - child refers to materials or topic so that listener knows, through verbal or nonverbal means, what is described.

B. Non-specific - referent not specified in description, "this one".

TABLE 4

FREQUENCY AND PERCENTAGE OF PEER INSTRUCTIONAL

EPISODE TYPES BY AGE GROUPS

Episode Type	Kindergarten N	Kindergarten (Percent)	Second Grade N	Second Grade (Percent)
Teaching Bids	53	(30.0)	88	(14.0)
Learning Bids	45	(25.4)	146	(24.0)
Pacing	5	(2.8)	22	(3.6)
Management	12	(6.8)	12	(1.9)
Self Evaluation	35	(19.8)	82	(13.5)
Joining	8	(4.5)	20	(3.2)
Collaborative	7	(4.0)	174.	(28.7)
Others [a] not analyzed	12	(6.7)	48	(7.9)
Total	177		592	

[a]Includes episodes in which the adult teacher was involved, no known response occurred; a child without parental permission to record was speaking; speech to self; fragments; "blends" of teaching bids, learning bids, and collaborative episodes.

A child might be pleased with a new accomplishment, and express a positive self-evalutation ("What a good fish"). If no acknowledgement is received, the child might repeat the message with an attention-focusing statement ("Hey, this is a big fish") or in an indirect form ("Do you know I can cut this fish with one hand?", "I hope whoever gets this fish will like it"). A continuum might also operate from negative self-evaluation ("I'm having trouble"), leading to joining ("Is anyone sitting here?"), to explicit learning bids ("How do you do this?").

This framework allows us to understand the developmental differences observed between the two age groups. Younger children were more likely than older ones to make both self-evaluative and teaching statements to other children. They also used their pacing statements to draw attention to their own activity ("Look at mine") and seemed to seek to manage behavior for its own sake ("Sit down", "Stop it"). The seven-year-olds used pacing and managing embedded in teaching or learning sequences to facilitate the achievement of their learning goal ("Hurry up, these will be checked at two o'clock.").

To examine the possibility that these evaluations and teaching "announcements" may function similarly to elicit acknowledgment of the teacher's competence, we compared the way children became engaged in the teaching role between those children who initiated their teaching episodes (whom we dubbed the "advertisers") and those who engaged in the teaching role primarily in response to the questions of other children (these we called the "consultants"). It is interesting that the most active teachers, those most frequently engaged in teaching episodes, were the consultants rather than the advertisers. Similarly, some children

in the learner role were taught spontaneously by other children, whereas others articulated their needs explicitly. In this second grade classroom, the two children who received the most unsolicited information from their peers were also the ones most frequently sought as consultants. This pattern suggests that a small number of children may be at the crossroads of learning exchanges, and are both contributing to and benefiting from these interactions, while others miss both the challenge of questions and the benefit of instruction from their peers.

Consequences of discourse patterns

Individual utterances in the teaching and learning episodes were examined to assess whether patterns of discourse were predictive of the outcomes of these episodes. A sample of 50 episodes of each type for each age group were coded for the frequency of utterances reflecting typical conversational acts in the teacher-learning exchange, including attention focusing (e.g., "Hey, Bill"), requesting action, requesting or offering information, requesting help, relevant comments, irrevlevant comments, and evaluative comments. Each request for action or information was also coded for its referential specificity. Distinctive patterns in the use of these communicative behaviors have been found to be associated with effectiveness on more structured experimental tasks of peer learning (Cooper, 1980; Cooper, Ayers-Lopez, & Marquis, in press).

The responses to these utterances provided the basis for evaluating the outcomes of the episodes. Chi-square analyses were conducted to assess the contingencies between the use of each utterance function and the outcome of the episode. Learner bids were considered effective when they elicited an informative reply. Teaching bids were judged effective

when learners accepted the offered information either by acknowledging, elaborating, or making an appropriate nonverbal response. Outcomes were rated as mixed if the listener responded with an argument or correction, or with an additional question or directive. Finally, both teaching and learning bids were considered failures if the listener responded by rejecting, giving an irrelevant response or ignoring the speaker. Those episodes with multiple rounds were rated for the outcome of the first round, subsequent rounds, and the episode as a whole.

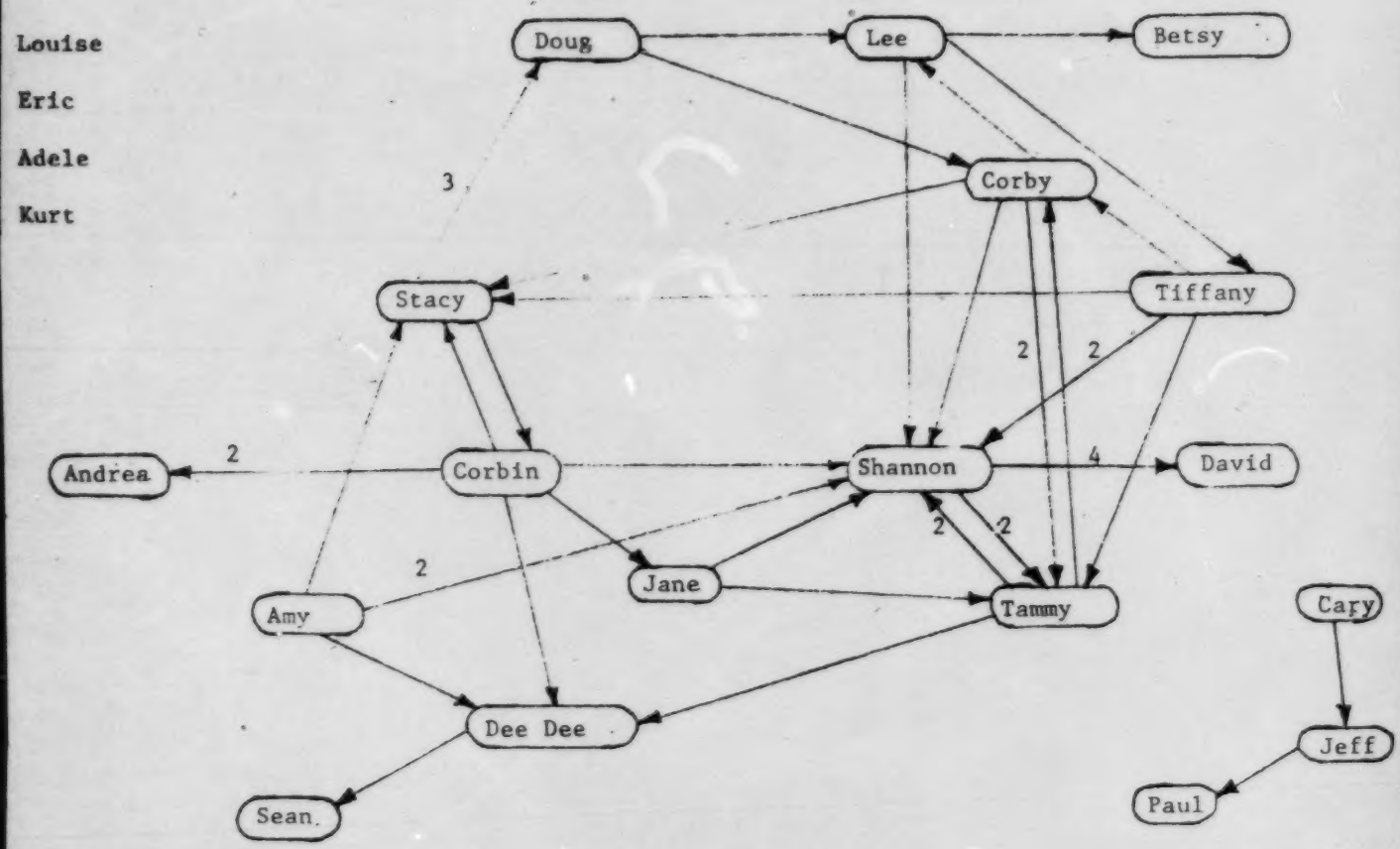
The Learner Role

The process of negotiation of roles is vividly illustrated in the learner-initiated episodes, in which the child needing information must select a knower and get him or her to agree to provide it. Figure 2 illustrates patterns in who asked for help and who was asked for help for a random sample of 31 instructional episodes. It shows that some children played more of a consultant role than others, some played both an information-seeking and information-providing roles, and others primarily initiated help-seeking bids. Finally, some children rarely engaged in information exchanges with others. A comparison of these patterns with the patterns of association reveals that some children sat near others but did not exchange information with them, while others' instructional isolation was congruent with their general interpersonal situation.

In a learner-initiated instructional episode, a child who needs help presumably is motivated to select a child who is likely to be able to provide it. It might be expected, then, that the flow of children's questions would reflect the hierarchy of ability in the group as children find through experience who the good resources are. In the second grade

Figure 2

Sociogram of Pattern of 31 Learner-initiated Bids in Second Grade Classroom



classroom, two children were performing at sixth grade level, with generally a substantial gap between them and other students. Only one of these, Shannon, was target of queries from her peers, while David received bids only from Shannon herself. Shannon was a member of a stable social group, from which a portion of her advisees were drawn, while David associated almost randomly as he chose a place to work. Thus ability was not the only criterion for an effective teacher. Second, the person regarded as the leader depended upon the context. Shannon was consulted in math and spelling, but she deferred to her friend Tammy during handwriting.

Amy: 3 times 5 is...

Shannon: 15.

Julie: 16.

Shannon: 15.

Jane: 25.

Amy: I go by the rules of Shannon.

In order for a learner bid to be successful, the potential teacher must not only accept the teaching role, but also be able to provide the information requested. Among both age groups, successful learners used questions, as opposed to indirect statements such as "this one's too hard for me", and referred to the materials or the problem involved. Kindergarten children's use of attention-focusing statements typically met with failure, perhaps because they were frequently expressed without accompanying instrumental statements (e.g. "Jody!"), leaving the listener with no idea of what response was expected or desired. The prospective child-teacher was often engaged in other activity and unless instructed

as to what was needed, would simply ignore the bid. The success of pairing attention-focusing statements with other moves either in the same round or later in the conversation was reflected in the overall ratings, in which attention-focusing statements were highly associated with positive outcomes. In contrast, effective second grade children used attention focusing to precede their questions, and on many occasions, first elicited an acknowledgment that the listener was willing to respond ("Hey Bill, are you busy?", "No", "What is this called?").

Asking for information was almost always successful on the first as well as later bids. The degree of referential specificity did not appear to influence the outcome of these learner bids. If the first bid was not understood, the learner could provide either verbal or nonverbal clarification, especially since learners typically asked about tasks to which they could point.

L: What does that say?

T: No, wait...let me look. Oh. "Questions".

* * * * *

L: Can I use your thing?

T: This?

L: Yeah.

Learners expressed very few evaluative statements. Usually they requested information involving the process or task at hand, rather than feedback about their own performance. Finally, after initial failure to elicit a response, learners engaged in a variety of strategies that were ultimately fruitful, ranging from simply repeating the initial bid; bargaining, shaming, begging, or threatening; increasing the specificity

of the reference; or seeking another child or the adult teacher.

The Teacher Role

Unlike learner bids for information, child teachers did not always elicit a response. The child teacher needs the learner to accept the role as well as the information being offered, by acknowledging ("Oh, yeah"), elaborating, or making an appropriate nonverbal response. The child cast in the learner role may accept it but dispute the veracity of the information and correct it, or reject the teacher altogether ("Who cares?", "Bug off!"). Of course, these "failures" may ultimately result in learning as the learner corrects the teacher, or as both generate a new solution.

Attention-focusing statements were not used frequently in teaching bids in either age group. Kindergarten and second grade children were effective when conveying information through direct requests for action ("Don't let it drip", "Take the colors back", "Do 'fist'"). Descriptive comments simply announced on the first bid had an equal chance of success or failure, but when used later in conjunction with other kinds of statements, were highly associated with success. The basic gloss of these descriptive statements seemed to be "I know this now." (e.g., "Fish have feet. I found out"), and after the listener had had an opportunity to question or clarify such statements, they were typically acknowledged.

The use of relevant comments and specificity were highly associated with the success of the teaching episodes, although even five-year-olds seemed able to repair the ambiguity of nonspecific bids.

T: Your're supposed to be doing that page.

L: Which page?

T: This one. (points)

Finally, role negotiation continued implicitly throughout these instructional episodes. A child teacher might "lose his or her job" if the child seeking information detected that it was not correct. However, arguments were more likely in teacher-initiated episodes when a reluctant learner, who already knew enough to reject the proferred information, did so.

Role-switching was also observed among both kindergarten and second grade children who were frequent companions. A child in the teaching role in a friendship pair might encourage the child who was typically a learner to be a teacher, while the first child took the role of the learner. In cases when this was observed, the more experienced child-teacher might provide an answer book so that the learner did not have to depend on his or her own knowledge. This was seen with both riddle books and spelling word lists. It appears that the child-teachers can tolerate sharing the status of the teacher with their friends. In general, the collaborative role was one utilized most by the children who worked together in stable friendship groups, since it seemed to require finely tuned reciprocated interaction, whether for turn-taking ("O.K., you read one page and I'll read one page"), or a common goal ("Sure, you can copy ... what are friends for?").

Content

To consider the function of learning and teaching bids in the broader context of classroom learning, the episodes were coded (following Bellack, et al., 1966) as concerned either with instructional issues involving procedures for activities (e.g. "What page are we on?") or

substantive issues, referring to the subject matter under study ("Can penguins fly?"). Of the episodes tabulated within the second grade, 79% of the learner-initiated episodes and 71% of the didactic episodes concerned substantive issues, the remainder in each category being procedural. This pattern indicates that children can offer one another resources in either area, but that children are viewed by their peers as having information that is of central import in classroom learning. Issues considered substantive by kindergarteners might have been viewed as procedural for the second graders: learning how to cut paper with one hand was the goal discussed among several five-year-olds, but it was simply the means of achieving other goals for a group of seven-year-olds. Much of the kindergarteners' interaction involved mastering such skills, whereas second graders' activities focused on more abstract issues, and their procedural concerns focused on the rules governing their activities such as cheating, helping, or pacing of their work.

General Discussion and Summary

The observations reported in this paper demonstrate different methodological approaches to the study of how children help one another learn, yet have yielded convergent and complementary findings on central dimensions of this complex phenomenon. Overall, we have addressed three basic issues: questions about the forms and functions of peer learning interactions; about developmental changes in their nature; and about the features of discourse that enhance their effectiveness.

In the open classroom, children's access to one another is not extensively regulated by any central figure. Mehan has observed that "while teacher-directed lessons are dominated by elicitation of information, peer instruction is characterized by the giving and receiving of information. While the teacher relies on the verbal modality to a great extent, students demonstrate their instructions, cooperatively complementing tasks together" (1979, p. 200). Our observations suggest, however, that admission to peer learning exchanges is not as automatic as we might suppose. Children are involved to widely varying degrees in this giving and receiving process as it occurs within the complex stream of classroom interaction. These differences in how children bridge the gap from the individual tasks of mastery to participation in the interpersonal life of the classroom can be seen as some children only bemoan to themselves their frustrations and failures, while others advertise their new insights, offer unsolicited corrections, and coordinate apprenticeships, partnerships, or arguments.

Our findings of differences between kindergarten and second grade in the peer learning episodes reflect basic developmental changes

occurring during this period in children's ability to reflect on their own understanding and behavior as well as the knowledge of others. Children become more aware, for example, of the relative states of understanding between themselves and others sitting at a table, so that a child may work slowly while waiting for a friend, or bargain with a potential teacher to obtain help. These developmental data extend the observations of preschool children reported by Schacter et al. (1974). Together the data indicate that from three to seven years, explicitly ego-enhancing statements and simple announcements increase and then decline, while collaborative exchanges increase. As language is used with increasing skill to coordinate self with others, children learn to use attention-focusing and behavior management to negotiate and sustain their partner's involvement in interaction, and the one-round encounters lengthen to become multi-round arguments, practice sessions, and discussions.

Multiple sources of evidence point to the significance of the role relationship between the two children who enter into a learning partnership. The effectiveness of directives in the experimental cooperative task, in which pairs of friends worked as equals on a shared concern, contrasted with the asymmetrical power relationship of the didactic situation, in which children were paired by the experimenter, and in which suggestions for action were acceptable only in a more subtle form of declarative comments. From a different perspective, observations in the classroom confirmed the significance of the acceptability of the peer learning relationship to its participants. Children's effectiveness in these coordinations is seen when they can approach and engage a listener, and when they can make their purpose clear. Classroom patterns of

consultation and teaching were highly differentiated, and the importance of the acceptability of didactic and learner roles was clearly demonstrated when either Teacher's offers were rejected ("I'll go by the rules of Shannon") or when Learners needed to be persistent and ingenious to secure the help of another child.

Evidence from both studies also affirms the significance of informativeness in effective peer learning. The experimental task highlighted the helpfulness of precise communication, whether by gesture in pointing or showing, or by using labels to distinguish the particular block of interest. Likewise, in the classroom the children who were spontaneously selected as teachers were those who were capable of providing clear and informative feedback.

The importance of attentional factors differed in the experimental and classroom situations. In the experimental context, which was designed to be free from distractions, the use of attention-focusing statements was not associated with effectiveness, although it has been shown to be with three-year-olds on the cooperative task (Cooper, 1980). In the classroom, the competing distractions of nearby children working on different tasks made attracting and maintaining the attention of the listener a key component of the instructional episodes.

When attentional focusing was linked to requests, the request was direct rather than hinted, and an initially vague reference could be disambiguated, then children were more successful in achieving their goals.

Among the many directions for future research are several significant issues. Developmental work in classrooms will illuminate the relation between both cognitive and social skills and the form, function, and

outcome of the negotiation of peer-assisted learning. Experimental work is necessary for clarifying the components of the teaching and learning process. For example, what are the developmental patterns by which children monitor their own state of understanding and that of their listener, in order to offer help or seek it effectively? How do they communicate this information (Markam, 1977)? The role of sequencing appears to be a distinguishing one in the teacher role; frequently younger children guided their partners on a step-by-step basis, whereas older teachers provided orientation-both procedural and substantive-in an opening monologue. Future sociolinguistic work in classrooms is needed to illuminate the relationship between peer learning and adult-child and child-adult interactions (e.g., Merritt, 1979), as well as the role of instructional context in communicative style. Our observations in both experimental and classroom contexts demonstrate, sometimes poignantly, that children differ in their access to one another as resources and in their effectiveness in communicating their learning needs or in offering help. By identifying the skills associated with effectivenss, remediation of these skills can be achieved.

The work reported here sheds a new light on issues of current interest in the area of cooperative learning in classrooms. In two recent reviews, Slavin (1980) and Sharan (1980) summarize the extensive evidence that cooperative task structures in elementary and secondary classrooms enhance not only academic achievement, but also self-esteem, relationships among black, white, and Mexican American groups, and liking of school. It is notable that for the most part, current work in the area of cooperative learning addresses neither developmental changes in peer

learning patterns nor the role of the process of peer interaction itself in peer learning outcomes. By demonstrating the existence and consequences of striking developmental and within-group individual differences in peer learning, and identifying features of communicative process associated with effectiveness, this present study contributes to the identification of ways children's access to learning opportunities can be rendered more equitable.

Implications for the Classroom

The findings from this project have significant implications for enhancing children's learning, and especially for improving equity of learning opportunities in classrooms. The implications of this research spring from our findings of striking individual differences in the abundance and quality of involvement in peer learning. Not only have we found that the children who learn are those that can ask, but we also see indications that the children who give information are likely to be the ones who receive it. Sociologists who study group process speak of "expert power", which individuals accrue as a function of their perceived competence rather than by dominating or coercing others. We see that those children who are known to be competent are approached by others not only to be asked questions, but also to be informed of new learnings by other, knowing, children.

In our discussions with teachers several recurring questions have been expressed. Some teachers have wondered how peer learning activities can succeed if not every child has knowledge desired by others. Teachers can enhance peer learning by allowing children to develop areas of individual expert power or expertise and helping them demonstrate this competence to others. (The conventional "show and tell" format seems unlikely to be an appropriate means for showcasing all kinds of talent.) For example, a shy child in the kindergarten class we observed was very skilled in designing mobiles. The teacher encouraged him to demonstrate to the class how to make cuttings on paper to produce them, and within a short time all the children in the class had constructed their own mobiles, and were able to view this child as possessing valued knowledge.

Teachers can engender and recognize expertise among their students in many ways. One major area concerns the instructions teachers give for daily activities, such as a cooking, science, or writing assignments. With an "instructional chain" (Cazden, 1979) one child can be taught how to do an activity and then given the responsibility for teaching others. The teacher could rotate which children were the "experts of the week."

Other teachers use the "jigsaw" technique (Aronson et al 1968) in which assignments are divided into interlocking pieces, which must all be combined for any one child to succeed.

Another question concerns how peer learning can first be introduced into a classroom. One primary grade teacher uses a gradual approach by starting her class in September with a more highly structured format. She gives children their assignments for the morning, then allows them to talk together, at first on a trial basis for a brief period, such as fifteen minutes. If the children can work smoothly under these circumstances, she increases the peer learning time, but if they cannot handle that much responsibility, she drops back to a shorter length of time after a few days.

Especially by the second grade, teachers need to be aware of the nature of the social network of their group in order to facilitate the functioning learning centers or any learning group. For example, a child may be unwilling to take the learner role with someone who is not trusted, whereas an empathetic child-teacher can improvise face-saving "teaching" activities for a less competent friend. Feelings of jealousy some children may have towards children considered the experts can be

reduced when more children have an opportunity to have this role on a regular basis.

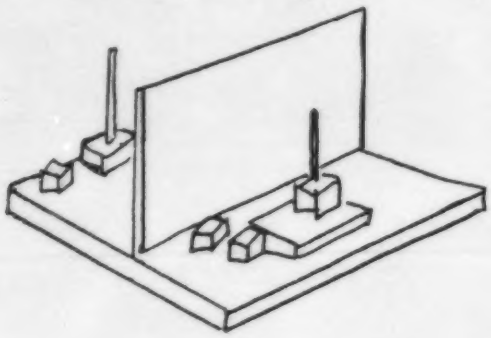
In summary, our findings indicate the significance of the age and the relationships among children who enter into learning partnerships. Such developmental findings complement and extend investigations of Cazden (1979), Mehan (1979), Merrit (1979), and others who have focused on single age samples or adult-child classroom interactions, and provide significant implications for teaching, not only in the open classroom, but in mainstreamed groups (e.g., Guralnick, 1978), newly integrated rooms, or simply in enriching the potential resources of any child in a group.

Appendix A

Comparison of Traditional Dyadic Referential Communication Task and Cooper's Dyadic Problem Solving Task

I. Traditional Referential Communication Situation (Glucksberg et al., 1966)

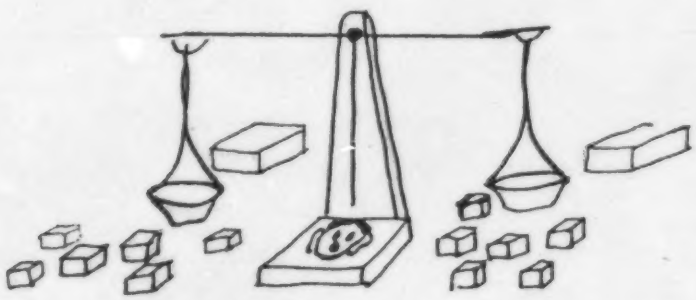
A. Speaker and listener separated by opaque barrier



B. Novel stimuli

II. Cooper's Dyadic Problem-solving Task

A. Speaker/listeners in full view of one another



B. Familiar Stimuli

Appendix B

Instructions in Experimental Task: Cooperative Condition[a]

Today you are going to play this block game. You are going to be partners and act like a team. Here is how you play. In this game you want to find blocks to make the pointer point right down to the clown. (Give matching training blocks to children) Here are your blocks, Mary and your blocks, Ann. Put them in these two pans. (Point to pans) Do they make the pointer point to the clown? Yes, they do. So we put them in the boxes right here. Mary, your block in your box and Ann, your block in yours. (Point to boxes separately) O.K., once they're in the box they stay there. They're all finished.

Let's try these blocks now. Go ahead and try them, Mary and Ann. (Give them non-matching blocks) Do they make the pointer point to the clown? No, they don't make the pointer point down to the clown. So we don't put them in the boxes. They go back into your piles.

Now, let's look at these blocks. (Take out experimental blocks) Here are your blocks, Mary and your blocks, Ann. Now, you can try them one at a time in the pans, and find the ones that make the pointer point down to the clown. (Point to clown) Remember, when you find two blocks that point to the clown, then put your block in your box and yours in your box. Then you can find two more and two more until they are all gone. It is fun to play this game with your partner. (Get up to walk to table)

Wait just a minute before you start. While you play the game I will be over here at the table doing some work. So you can talk together just

like you always do. (Go to table, taking training blocks) Now go ahead and talk loud enough so your partner can hear you, and play the game. Let me know when you are finished.

---

[a]Experimenter instructions are given in parentheses.

Appendix C

Instructions in Experimental Task: Didactic Condition

Today you are going to teach this block game to your friend, (learner). You are going to be the teacher and tell (learner) how to play.

Let's make sure you remember how to play. In this game you want to find blocks to make the pointer point right down to the clown. (Point to clown) Let's try these two blocks. Put them in these two pans. (Use matching training blocks; let child put them in) Do they make the pointer point to the clown?(pause) Yes, they do. So we put them in the boxes right over here. Your block in your box and I'll put this one in this box. Fine. (Point to boxes)

O.K., once they're in the box they stay there. They're all finished.

O.K., let's try these blocks now. Go ahead and try them. (Use non-matching training blocks) Do they make the pointer point to the whole clown? They don't make the pointer point to the clown,so we don't put them in the box. They go back in your piles. (Point to piles)

We're finished with these, so I'll take them away. (Take training blocks away) Now let's look at these blocks. (Take out experimental blocks) Here are your blocks, (Teacher) and these are your friend's blocks. (Point to separate piles)

Now, I'm going to bring (learner) in. I want you to tell (learner) how to play this game because (learner) has never played this game before. (Bring learner in) (Learner), (teacher) is going to teach you how to play this block game. (Teacher), you tell (learner) how to play this

block game because (s)he has never played the game before. (Get up and walk to table, take training blocks)

Wait just a minute before you start. While you play the game I will be over here at the table doing some work. So you can talk together just like you always do. (Go to table, taking training blocks) Now go ahead and talk loud enough so your partner can hear you, and play the game. Let me know when you are finished.

Dissemination Activities to Date

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Cooper, C.R. The role of peer interaction in children's learning. Texas Home Economist, 1980, 16, 9-12.

Cooper, C.R., Ayers-Lopez, S. & Marquis, A. Children's discourse during peer learning in experimental and naturalisitic situations. Discourse Processes, in press, 1981.

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